CLAIMS

1. A method of fabricating a flat product of zirconium alloy, the method being characterized by:

· preparing or casting a zirconium alloy ingot containing at least 95% by weight of zirconium, and including the usual impurities and alloying elements;

· shaping said ingot in order to obtain a flat product;

· subjecting said flat product to a β quenching operation under conditions that are determined to obtain within the flat product an acicular structure at the end of said β quenching;

· subjecting said flat product, after the β quenching, to a rolling operation performed in a single rolling sequence without intermediate annealing, said rolling being performed at a temperature lying in the range ambient to 200°C, with a reduction ratio lying in the range 2% to 20%; and

· subjecting said rolled flat product to an annealing treatment in the α range or in the α + β range, performed in the temperature range 500°C to 800°C for 2 min to 10 h.

2. A method according to claim 1, characterized in that its alloy element contents by weight are: Sn = 1.2% - 1.7%; Fe = 0.07% - 0.20%; Cr = 0.05% - 0.15%; Ni = 0.03% - 0.08%; O = 900 ppm - 1600 ppm.

3. A method according to claim 1, characterized in that its alloy element contents by weight are: Sn = 1.2% - 1.7%; Fe = 0.18% - 0.24%; Cr = 0.05% - 0.15%; O = 900 ppm - 1600 ppm.

4. A method according to claim 1, characterized in that its alloy element contents by weight are: Sn = 0.5% - 2%; Nb = 0.5% - 2%; Fe = 0.1% - 0.5%.

5. A method according to claim 1, characterized in that its alloy element contents by weight are: Sn = 0.5% - 2%; Fe = 0.1% - 1%; Cr = 0.1% - 1.2%.

6. A method according to claim 1, characterized in that its alloy element contents by weight are: Nb = 1.5% - 3.5%; Sn = 0.5% - 2%.

7. A method according to any one of claims 1 to 6, characterized in that the rolling following the β quenching is performed with a reduction ratio of 5% to 16%.

8. A method according to claim 7, characterized in that the rolling following the β quenching is performed with a reduction ratio of 5% to 10%.

9. A method according to any one of claims 1 to 8, characterized in that the cooling of the β quenching is performed at a speed of at least 1°C/s.

10. A zirconium alloy flat product, characterized in that it is obtained by the method according to any one of claims 1 to 9.

11. A fuel assembly element for a light water reactor for a nuclear power station, the element being characterized in that it is obtained by shaping a flat product according to claim 10.

12. A fuel assembly element for a nuclear power station reactor according to claim 11, characterized in that it consists in a box for a boiling water nuclear reactor.

13. A fuel assembly element for a nuclear power station reactor according to claim 11, characterized in that it consists in a grid for a boiling water reactor.

14. A fuel assembly element for a nuclear power station reactor according to claim 11, characterized in that it consists in a grid for a pressurized water reactor.

15. A fuel assembly element for a nuclear power station reactor according to claim 11, characterized in that it consists in a central tube defining water circulation paths.

US CLAIMS:

1. A method of fabricating a flat product of zirconium alloy, the method comprising the steps of:

· preparing or casting a zirconium alloy ingot containing at least 95% by weight of zirconium, and including the usual impurities and alloying elements;

· shaping said ingot in order to obtain a flat product;

· subjecting said flat product to a β quenching operation under conditions that are determined to obtain within the flat product an acicular structure at the end of said β quenching;

· subjecting said flat product, after the β quenching, to a rolling operation performed in a single rolling sequence without intermediate annealing, said rolling being performed at a temperature lying in the range ambient to 200°C, with a reduction ratio lying in the range 2% to 20%; and

· subjecting said rolled flat product to an annealing treatment in the α range or in the α + β range, performed in the temperature range 500°C to 800°C for 2 min to 10 h.

2. A method according to claim 1, wherein its alloy element contents by weight are: Sn = 1.2% - 1.7%; Fe = 0.07% - 0.20%; Cr = 0.05% - 0.15%; Ni = 0.03% - 0.08%; O = 900 ppm - 1600 ppm.

3. A method according to claim 1, wherein its alloy element contents by weight are: Sn = 1.2% - 1.7%; Fe = 0.18% - 0.24%; Cr = 0.05% - 0.15%; O = 900 ppm - 1600 ppm.

4. A method according to claim 1, wherein its alloy element contents by weight are: Sn = 0.5% - 2%; Nb = 0.5% - 2%; Fe = 0.1% - 0.5%.

5. A method according to claim 1, wherein its alloy element contents by weight are: Sn = 0.5% - 2%; Fe = 0.1% - 1%; Cr = 0.1% - 1.2%.

6. A method according to claim 1, wherein its alloy element contents by weight are: Nb = 1.5% - 3.5%; Sn = 0.5% - 2%.

7. A method according to claim 1, wherein the rolling following the β quenching is performed with a reduction ratio of 5% to 16%.

8. A method according to claim 7, wherein the rolling following the β quenching is performed with a reduction ratio of 5% to 10%.

9. A method according to claim 1, wherein the cooling of the β quenching is performed at a speed of at least 1°C/s.

10. A zirconium alloy flat product, obtained by the method according to claim 1.

11. A fuel assembly element for a light water reactor for a nuclear power station, the element being obtained by shaping a flat product according to claim 10.

12. A fuel assembly element for a nuclear power station reactor according to claim 11, the element consisting in a box for a boiling water nuclear reactor.

13. A fuel assembly element for a nuclear power station reactor according to claim 11, the element consisting in a grid for a boiling water reactor.

14. A fuel assembly element for a nuclear power station reactor according to claim 11, the element consisting in a grid for a pressurized water reactor.

15. A fuel assembly element for a nuclear power station reactor according to claim 11, the element consisting in a central tube defining water circulation paths.